

## CIRCULAR HEATER GUARD

## BACKGROUND OF THE INVENTION

## 1. Field of the Invention

The present invention relates to a circular heater guard. More particularly, it relates to a heater guard as a safety measure for use with an indoor heater such as an oil heater or an electric heater.

## 2. Prior Art

Heater guards as safety measures for use with oil heaters or electric heaters are already known from Japanese Patent Laid-Open Publication No. 10-185214(1998) entitled "Guard for Heaters" or Japanese Utility Model Registration No. 3,067,648 entitled "Heater Guard". The above prior art references relate to heater guards for rectangular (cubic) heaters and are arranged in that top surfaces thereof are left open.

The present invention relates to a heater guard for circular (cylindrical) heaters provided with guarding functions also for the top surface, and it is an object thereof to prevent people from coming close thereto.

Moreover, the above prior art references are arranged in that fixing members such as bolt rods, fly nuts and screws, which are provided independently from a main body of the guard, are used for fixing four panels enclosing four peripheral surfaces of a rectangular (cubic) heater. Since such fixing members are independent from the guard main body, the user may lose them when storing the heater at off-season time. It is thereof an object of the present invention to fixedly connect a lid cover and a main body cover without the use of any fixing members such as bolt rods, fly nuts and screws that are provided independently from the

guard main body.

## SUMMARY OF THE INVENTION

The circular heater guard of the present invention is arranged in that a circular heater guard is comprised of

an upper surface guard that encloses a circular heater respectively from above a top surface and from above peripheral surfaces while being suitably spaced apart therefrom and a main body guard that encloses the peripheral surfaces of the circular heater while being suitably spaced apart therefrom,

and in that each connecting and fixing tool for integrating the upper surface guard and the main body guard is comprised of

a mounting and supporting portion that is fixed to an upper half portion of the main body guard,

an elongated horizontal portion having a horizontal surface that is formed by bending an elongated portion of the mounting and supporting portion in an outer peripheral direction, and

a locking portion that is formed on an upper surface of the elongated horizontal portion and that may be freely engaged with a peripheral surface upper cover portion of the upper surface guard.

According to embodiments of the present invention,

the main body guard is comprised of a pair of semi-cylindrical guards comprised of vertical rods and semi-circular horizontal rods.

Lower end horizontal rods of the upper surface guard are engaged with connecting and fixing tools welded to upper end portions of the pair of semi-circular guards for

integrating the upper surface guard and the main body guard.

The locking portion forms a locking space with an elongated portion of the elongated horizontal portion being first bent upward, then bent towards an inner peripheral direction, and finally bent downward, and this locking portion also forms an inserting clearance between a tip end and the elongated horizontal portion for allowing free insertion of the horizontal rods of the upper surface guard therein, and an engaging projection is formed in the locking space through the elongated horizontal portions for engaging the horizontal rods of the upper surface guard in the locking space.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a schematic front view illustrating a positional relationship between a circular heater and the circular heater guard according to the present invention.

Fig. 2 is a front view of the circular heater guard according to the present invention.

Fig. 3 is a plan view of the same.

Fig. 4 is a longitudinal sectional view of the same.

Fig. 5 is a perspective view of a main body guard.

Fig. 6 is a partial perspective view of an upper surface guard.

Fig. 7 is a perspective view of a connecting and fixing tool.

Fig. 8 is a front view of the same.

Fig. 9 is a front view for explaining locking actions of the same, wherein Fig. 9(a) illustrates a condition at the start of locking operations, and Fig. 9(b) a condition in which locking operations are completed.

## DETAILED DESCRIPTION OF THE INVENTION

An embodiment of the present invention will now be explained with reference to the accompanying drawings for describing the present invention in details.

With reference to Figs. 1 to 4, a circular heater guard A of the present invention is comprised of an upper surface guard 2 that encloses a circular heater B from above a top surface and from above peripheral surfaces while being suitably spaced apart therefrom and a main body guard 1 that encloses the peripheral surfaces of the circular heater B while being suitably spaced apart therefrom.

The main body guard 1 is comprised of a pair of semi-circular guards 10A, 10B in which a plurality of vertical rods 11 and semi-circular horizontal rods 12 at upper and lower end portions are welded and integrated. Upper end elongated portions and lower end elongated portions of the vertical rods 11 are bent inward for forming horizontal elongated pieces 13. Some part of the horizontal elongated pieces 13 are elongated to be of a length that reaches the peripheral surfaces of the circular heater B for comprising main body guard fixing guides 14, 15.

The upper surface guard 2 is arranged in that its upper surface is integrated by welding a plurality of radially extending horizontal rods 21 with three circular rods 22. Tip ends of the horizontal rods 21 are bent downward for comprising bent pieces 23.

The peripheral surfaces of the upper surface guard 2 is arranged in that elongated portions of the horizontal rods 21 are first bent to form inclined rods 24 and then bent to form vertical rods 25. Upon forming lower arc-like rods 26, intermediate arc-like rods 27 and upper arc-like rods 28 for connecting the tip ends of the vertical rods 25 thereafter, the peripheral surfaces of the upper surface guard 2 are comprised by the vertical rods 24, the inclined rods 24, the lower arc-like rods 26, the intermediate arc-like rods 27 and the upper arc-like rods 28.

With reference to Figs. 7 and 8, each connecting and fixing tool 3 is comprised of a mounting and supporting portion 4 that is welded (w) and fixed to one of the upper ends of the vertical rods 11 of the main body guard 1, an elongated horizontal portion 5 having a horizontal surface that is formed by bending an elongated portion of the mounting and supporting portion 4 towards an outer peripheral direction and a locking portion 6 that is formed on an upper surface of the elongated horizontal portion 5 and that may be freely engaged to one of the lower arc-like rods 26 of the peripheral surfaces of the upper surface guard 2.

The locking portion 6 is arranged in that an elongated portion of the elongated horizontal portion is first bent upward, whereupon the elongated portion is bent towards the inner peripheral direction, and by then bending the elongated portion downward, a locking space H is formed. Moreover, an inserting clearance G allowing free insertion of one of the horizontal rods of the upper surface guard therein is formed between the tip end and the elongated horizontal portion, and an engaging projection 7 is formed in the locking space through the elongated horizontal portion for making one of the horizontal rods of the upper surface guard engage in the locking space.

With reference to Fig. 4, the main body guard fixing guides 14 projecting inward from the upper end portions of the main body guard 1 are engaged at holes 31 formed on an outer heater casing 30 of the circular heater B and by making the main body guard fixing guides 15 projecting inward from the lower end portions of the main body guard 1 engage at holes 32 formed on the outer heater casing 30, the main body guard 1 is integrated with the outer heater casing 30 of the circular heater B.

In this manner, the pair of right and left semi-cylinders 10A, 10B are fixed to each other through the outer heater casing 30 of the circular heater B and the upper surface guard 2

to be integral, and the circular heater guard A of the present invention will thus be fixed to the circular heater B.

When accumulating and storing the guard, by releasing the engagement of the connecting and fixing tools 3 and the upper surface guard 2, the upper surface guard 2 and the main body guard 1 are separated, and by releasing the engagement between the main body guard fixing guides 14, 15 of the main body guard 1 and the holes 31, 32 of the outer heater casing 30 of the circular heater B, the pair of right and left semi-cylinders 10A, 10B comprising the main body guard 1 are separated from each other while they are also separated from the outer heater casing 30 of the circular heater B. In this manner, the pair of right and left semi-cylinders 10A, 10B and the upper surface guard 2 may be stored in separated conditions. At the time of storage, the connecting and fixing tools 3 are fixed at the main body guard 1.

While the present invention provides a heater guard that encloses a circular heater respectively from above a top surface and from above peripheral surfaces thereof while being suitably spaced apart therefrom, the guard may be separated into three parts, namely an upper surface guard and a pair of right and left semi-cylinders 10A, 10B comprising a main body guard, for reducing the volume for accumulation at the time of transportation or storage thereof.

Moreover, since connecting and fixing tools for integrating the upper surface guard and the main body guard are fixed at upper half portions of the main body guard, it is possible to exhibit the effects of simplifying manufacturing processes when compared to a case in which connecting and fixing members such as bolt rods, fly nuts and screws that are provided independently from a main body of the guard are used and of eliminating the fear of losing the connecting and fixing tools when storing the guard at off-season time or when transporting

the same.

The present invention contributes to developments in manufacturing industries related to oil heaters or electric heaters for promoting usage of indoor heaters such as oil heaters and electric heaters by improving safety measures for such indoor heaters such as oil heaters and electric heaters.